

SOUTH CAROLINA DEPARTMENT OF
HEALTH AND ENVIRONMENTAL CONTROL



Water Classifications and Standards
Regulation 61-68

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Bureau of Water

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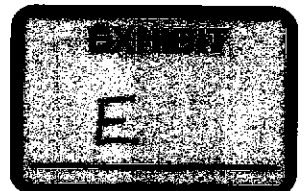


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established, or a Section 316(a) determination under the Federal Clean Water Act has been completed.

- c. The weekly average water temperature of all Freshwaters which are lakes shall not be increased more than 5°F (2.8°C) above natural conditions and shall not exceed 90°F (32.2°C) as a result of the discharge of heated liquids unless a different site-specific temperature standard as provided for in C.12. has been established, a mixing zone as provided in C.10. has been established, or a Section 316(a) determination under the Federal Clean Water Act has been completed.
13. Numeric criteria based on organoleptic data (prevention of undesirable taste and odor) are adopted herein. Those substances and their criteria are listed in the appendix. For those substances which have aquatic life and/or human health numeric criteria and organoleptic numeric criteria, the most stringent of the three shall be used for derivation of permit effluent limitations.
 14. Numeric criteria for the protection and maintenance of all classes of surface waters are adopted herein and are listed in Sections E, G, and the appendix. The numeric criteria developed and published by EPA are hereby incorporated into this regulation. Footnotes that further describe the application of these numeric criteria are included in the appendix.
 - a. Application of numeric criteria to protect aquatic life.
 - (1) The stated CMC value shall be used as an acute toxicity number for calculating permit effluent limitations.
 - (2) The stated CCC value shall be used as a chronic toxicity number for calculating permit effluent limitations.
 - (3) If metals concentrations for numeric criteria are hardness-dependent, the CMC and CCC concentrations shall be based on 25 milligrams/liter (mg/l) hardness (as expressed as CaCO₃) if the ambient hardness is less than 25 mg/l. Concentrations of hardness less than 400 mg/l may be based on the actual mixed stream hardness if it is greater than 25 mg/l and less than 400 mg/l and 400 mg/l if the ambient hardness is greater than 400 mg/l.
 - (4) If separate numeric criteria are given for fresh and salt waters, they shall be applied as appropriate. In transitional tidal and estuarine areas, the Department shall apply the more stringent of the criteria to protect the existing and classified uses of the waters of the State.
 - (5) The Department shall review new or revised EPA criteria for adoption by South Carolina when published in final form.
 - (6) If the State develops site-specific criteria for any substances for which EPA has developed national criteria, the site-specific criteria shall supersede the national criteria.
 - b. Application of numeric criteria to protect human health.
 - (1) If separate numeric criteria are given for organism consumption, water and organism

consumption (W/O), and drinking water Maximum Contaminant Levels (MCLs), they shall be applied as appropriate. The most stringent of the criteria shall be applied to protect the existing and classified uses of the waters of the State.

- (2) The Department shall review new or revised EPA criteria for adoption by South Carolina when published in final form by EPA.
- (3) If the State develops site-specific criteria for any substances for which EPA has developed national criteria, the site-specific criteria shall supersede the national criteria.
- (4) Adoption of EPA human health criteria does not preclude the Department from considering health effects of other pollutants or from considering new or revised EPA criteria when developing effluent permit conditions.

c. Application of criteria for the derivation of permit effluent limitations.

- (1) Numeric criteria for substances listed in Sections E, G, and the appendix shall be used by the Department to derive NPDES permit effluent limitations at the applicable critical flow conditions as determined by the Department unless an exception is provided below.
- (2) When the derived permit effluent limitation based on aquatic life numeric criteria is below the practical quantitation limit for a substance, the derived permit effluent limitation shall include an accompanying statement in the permit that the practical quantitation limit using approved analytical methods shall be considered as being in compliance with the limit. Appropriate biological monitoring requirements shall be incorporated into the permit to determine compliance with appropriate water quality standards. Additionally, if naturally occurring instream concentration for a substance is higher than the derived permit effluent limitation, the Department may establish permit effluent limitations at a level higher than the derived limit, but no higher than the natural background concentration. In such cases, the Department may require biological instream monitoring and/or WET testing.
- (3) When the derived permit effluent limitation based on human health numeric criteria is below the practical quantitation limit for a substance, the derived permit effluent limitation shall include an accompanying statement in the permit that the practical quantitation limit using approved analytical methods shall be considered as being in compliance with the limit. Additionally, if naturally occurring instream concentration for a substance is higher than the derived permit effluent limitation, the Department may establish permit effluent limitations at a level higher than the derived limit, but no higher than the natural background concentration.
- (4) NPDES permit effluent limitations for metals shall normally be expressed on the permits as total recoverable metals, but the Department may utilize a federally-approved methodology to predict the dissolved fraction, partitioning coefficient, or the bioavailable portion of metals in calculating these limits.
- (5) Except as provided herein, where application of MCLs or W/O numeric criteria using annual average flow for carcinogens, 7Q10 (or 30Q5 if provided by the applicant) for noncarcinogens, or comparable tidal condition as determined by the Department results

in permit effluent limitations more stringent than limitations derived from other applicable human health (organism consumption only), aquatic life, or organoleptic numeric values; MCLs or W/O shall be used in establishing permit effluent limitations for human health protection. The Department may, after Notice of Intent included in a notice of a proposed NPDES permit in accordance with Regulation 61-9.124.10, determine that drinking water MCLs or W/O shall not apply to discharges to those waterbodies where there is: no potential to affect an existing or proposed drinking water source and no state-approved source water protection area. For purposes of this section, a proposed drinking water source is one for which a complete permit application, including plans and specifications for the intake, is on file with the Department at the time of consideration of an NPDES permit application for a discharge that will affect or has the potential to affect the drinking water source.

- (6) Except as provided herein, where the Department may determine that an NPDES permitted discharge will not cause, have reasonable potential to cause, or contribute to an exceedence of the numeric criterion for turbidity under the following conditions:
 - i. The facility withdraws its surface intake water containing turbidity from the same body of water into which the discharge is made;
 - ii. The facility does not significantly concentrate or contribute additional turbidity to the discharged water;
 - iii. The facility does not alter the turbidity through chemical or physical means that would cause adverse water quality impacts to occur.
- (7) Site-specific permit effluent limitations and alternate criteria less stringent than those derived in accordance with the above requirements may be derived where it is demonstrated that such limits and criteria shall maintain the existing and classified uses, adequate opportunity for public participation in such derivation process has occurred, and the effluent shall not cause criteria for human health to be exceeded. Where a site-specific permit effluent limitation and alternate criterion has been derived, such derivation shall be subject to EPA review as appropriate. Also, at a minimum, opportunity for input in derivation of a site-specific permit effluent limitation and alternate criterion shall be provided via public notice in NPDES permit notices.
- (8) In order to protect for the consumption use of shellfish, for SFH waters and other waters with approved shellfish harvesting uses, the stated value of 14/100 ml for fecal coliform shall be used as a monthly average number for calculating permit effluent limitations and the stated value of 43/100ml for fecal coliform shall be used as daily maximum number for calculating permit effluent limitations.
- (9) In order to protect recreational uses for all waters of the State, the stated value of 200/100 ml for fecal coliform shall be used as a monthly average number for calculating permit effluent limitations and the stated value of 400/100ml for fecal coliform shall be used as daily maximum number for calculating permit effluent limitations. In order to protect recreational uses in Class SB saltwaters of the State, the stated value of 35/100 ml for enterococci shall be used as a monthly average number for permit effluent limitations and the stated value of 501/100 ml for enterococci shall be used as a daily maximum number for permit effluent limitations. In order to protect recreational uses in all other saltwaters of the State, the stated value of 35/100 ml for

APPENDIX: WATER QUALITY NUMERIC CRITERIA FOR THE PROTECTION OF AQUATIC LIFE AND HUMAN HEALTH

This appendix contains three charts (priority pollutants, nonpriority pollutants, and organoleptic effects) of numeric criteria for the protection of human health and aquatic life. The appendix also contains three attachments which address hardness conversions and application of ammonia criteria. Footnotes specific to each chart follow the chart. General footnotes pertaining to all are at the end of the charts prior to the attachments. Please refer to the text of the regulation for other general information and specifications in applying these numeric criteria.

PRIORITY TOXIC POLLUTANTS

	Priority Pollutant	CAS Number	Freshwater Aquatic Life		Saltwater Aquatic Life		Human Health		FR Cite/ Source
			CMC ($\mu\text{g/L}$)	CCC ($\mu\text{g/L}$)	CMC ($\mu\text{g/L}$)	CCC ($\mu\text{g/L}$)	For Consumption of: Water & Organism ($\mu\text{g/L}$)	Organism Only ($\mu\text{g/L}$)	
1	Antimony	7440360					5.6 B, ee	640 B, ee	65FR66443 SDWA
2	Arsenic	7440382	340 A, D, K	150 A, D, K	69 A, D, Y	36 A, D, Y	0.018 C, R, ff	0.14 C, R, ff	65FR31682 57FR60848 SDWA
3	Beryllium	7440417					J, ee	J, ee	65FR31682 SDWA
4	Cadmium	7440439	0.53 D, E, K	0.10 D, E, K	43 D, Y	9.3 D, Y	J, ee	J, ee	65FR31682 SDWA
5a	Chromium III	16065831	580 D, E, K	28 D, E, K			J, ee	J, ee	EPA820/B-96-001 65FR31682 SDWA
5b	Chromium VI	18540299	16 D, K	11 D, K	1,100 D, Y	50 D, Y	J, ee	J, ee	65FR31682 SDWA
6	Copper	7440508	3.8 D, E, K, Z	2.9 D, E, K, Z	5.8 D, Z, Y, ee	3.7 D, Z, Y, ee	1,300 T, ee		65FR31682
7	Lead	7439921	14 D, E, Y	0.54 D, E, Y	220 D, Y	8.5 D, Y			65FR31682
8	Mercury	7439976	1.6 D, K, dd	0.91 D, K, dd	2.1 D, bb, dd	1.1 D, bb, dd	0.050 B, ee	0.051 B, ee	65FR31682 SDWA

Priority Pollutant	CAS Number	Freshwater Aquatic Life		Saltwater Aquatic Life		Human Health		FR Cite/ Source
		CMC ($\mu\text{g/L}$)	CCC ($\mu\text{g/L}$)	CMC ($\mu\text{g/L}$)	CCC ($\mu\text{g/L}$)	For Consumption of: Water & Organism Only ($\mu\text{g/L}$)	Organism Only ($\mu\text{g/L}$)	
101 Heptachlor Epoxide	1024573	0.52 G, U	0.0038 G, U, X	0.053 G, U	0.0036 G, U, X	0.000039 B, C	0.000039B, C	65FR31682 65FR66443 SDWA
102 Polychlorinated Biphenyls PCBs	--		0.014 M, X		0.03 M, X	0.000064 B, C, M	0.000064 B, C, M	65FR31682 65FR66443 SDWA
103 Toxaphene	8001352	0.73	0.0002 X	0.21	0.0002 X	0.00028 B, C	0.00028 B, C	65FR31682 65FR66443 SDWA

Footnotes:

- A This water quality criterion was derived from data for arsenic (III), but is applied here to total arsenic, which might imply that arsenic (III) and arsenic (V) are equally toxic to aquatic life and that their toxicities are additive. In the arsenic criteria document (EPA 440/5-84-033, January 1985), Species Mean Acute Values are given for both arsenic (III) and arsenic (V) for five species and the ratios of the SMAVs for each species range from 0.6 to 1.7. Chronic values are available for both arsenic (III) and arsenic (V) for one species; for the fathead minnow, the chronic value for arsenic (V) is 0.29 times the chronic value for arsenic (III). No data are known to be available concerning whether the toxicities of the forms of arsenic to aquatic organisms are additive.
- B This criterion has been revised to reflect The Environmental Protection Agency's $q1^*$ or RfD , as contained in the Integrated Risk Information System (IRIS) as of May 17, 2002. The fish tissue bioconcentration factor (BCF) from the 1980 Ambient Water Quality Criteria document was retained in each case.
- C This criterion is based on carcinogenicity of 10^{-5} risk. As prescribed in Section E of this regulation, application of this criterion for permit effluent limitations requires the use annual average flow or comparable tidal condition as determined by the Department.
- D Freshwater and saltwater criteria for metals are expressed in terms of total recoverable metals. As allowed in Section E of this regulation, these criteria may be expressed as dissolved metal for the purposes of deriving permit effluent limitations. The dissolved metal water quality criteria value may be calculated by using these 304(a) aquatic life criteria expressed in terms of total recoverable metal, and multiplying it by a conversion factor (CF). The term "Conversion Factor" (CF) represents the conversion factor for converting a metal criterion expressed as the total recoverable fraction in the water column to a criterion expressed as the dissolved fraction in the water column. (Conversion Factors for saltwater CCCs are not currently available. Conversion factors derived for saltwater CMCs and CCCs). See "Office of Water Policy and Technical Guidance on Interpretation and Implementation of Aquatic Life Metals Criteria", October 1, 1993, by Martha G. Prothro, Acting Assistant Administrator for Water, available from the Water Resource center, USEPA, 401 M St., SW, mail code RC4100, Washington, DC 20460; and 40CFR§131.36(b)(1). Conversion Factors can be found in Attachment 1 - Conversion Factors for Dissolved Metals.
- E The freshwater criterion for this metal is expressed as a function of hardness (mg/L) in the water column. The value given here corresponds to a hardness of 25 mg/L as expressed as CaCO_3 . Criteria values for other hardness may be calculated from the following: $\text{CMC (dissolved)} = \exp[\ln a, [\ln(\text{hardness})] + b_a]$ (CF), or $\text{CCC (dissolved)} = \exp[\ln c, [\ln(\text{hardness})] + b_c]$ (CF) and the parameters specified in Attachment 2 - Parameters for Calculating Freshwater Dissolved Metals Criteria That Are Hardness-Dependent. As noted in footnote D above, the values in this appendix are expressed as total recoverable, the criterion may be calculated from the following: $\text{CMC (total)} = \exp[\ln a, [\ln(\text{hardness})] + b_a]$, or $\text{CCC (total)} = \exp[\ln c, [\ln(\text{hardness})] + b_c]$.
- F Freshwater aquatic life values for pentachlorophenol are expressed as a function of pH, and are calculated as follows: $\text{CMC} = \exp(1.005(\text{pH}) - 4.869)$, $\text{CCC} = \exp(1.005(\text{pH}) - 5.134)$. Values displayed in table correspond to a pH of 7.8.
- G This criterion is based on 304(a) aquatic life criterion issued in 1980, and was issued in one of the following documents: Aldrin/Dieldrin (EPA 440/5-80-019), Chlordane (EPA 440/5-80-027), DDT (EPA 440/5-80-038), Endosulfan (EPA 440/5-80-046), Endrin (EPA 440/5-80-047), Heptachlor (440/5-80-052), Hexachlorocyclohexane (EPA 440/5-80-054), Silver (EPA 440/5-80-071). The Minimum Data Requirements and derivation procedures were different in the 1980 Guidelines than in the 1985 Guidelines. For example, a "CMC" derived using the 1980 Guidelines was derived to be used as an instantaneous maximum. If assessment is to be done using an averaging period, the values given should be divided by 2 to obtain a value that is more comparable to a CMC derived using the 1985 Guidelines.
- H No criterion for protection of human health from consumption of aquatic organisms excluding water was presented in the 1980 criteria document or in the 1986 *Quality Criteria for Water*. Nevertheless, sufficient information was presented in the 1980 document to allow the calculation of a criterion, even though the results of such a calculation were not shown in the document.
- I This criterion for asbestos is the Maximum Contaminant Level (MCL) developed under the Safe Drinking Water Act (SDWA) and the National Primary Drinking Water Regulation (NPDWR).
- J EPA has not calculated a 304(a) human health criterion for this contaminant. The criterion is the Maximum Contaminant Level developed under the Safe Drinking Water Act (SDWA) and the National Primary Drinking Water Regulation (NPDWR).

- K This criterion is based on a 304(a) aquatic life criterion that was issued in the 1995 Updates: *Water Quality Criteria Documents for the Protection of Aquatic Life in Ambient Water*, (EPA-820-B-96-001, September 1996). This value was derived using the GLI Guidelines (60FR15393-15399, March 23, 1995; 40CFR132 Appendix A); the difference between the 1985 Guidelines and the GLI Guidelines are explained on page iv of the 1995 Updates. None of the decisions concerning the derivation of this criterion were affected by any considerations that are specific to the Great Lakes.
- L The CMC = $1/[(f1/CMC1) + (f2/CMC2)]$ where f1 and f2 are the fractions of total selenium that are treated as selenite and selenate, respectively, and CMC1 and CMC2 are 185.9 $\mu\text{g/l}$ and 12.82 $\mu\text{g/l}$, respectively.
- M This criterion applies to total PCBs, (e.g., the sum of all congener or all isomer or homolog or Aroclor analyses.)
- N The derivation of the CCC for this pollutant did not consider exposure through the diet, which is probably important for aquatic life occupying upper trophic levels.
- O This state criterion is also based on a total fish consumption rate of 0.0175 kg/day.
- P This water quality criterion is expressed as μg free cyanide (as CN/L).
- Q This value was announced (61FR58444-58449, November 14, 1996) as a proposed GLI 303 I aquatic life criterion
- R This water quality criterion for arsenic refers to the inorganic form only.
- S This water quality criterion for selenium is expressed in terms of total recoverable metal in the water column. It is scientifically acceptable to use the conversion factor (0.996 – CMC or 0.922 – CCC) that was used in the GLI to convert this to a value that is expressed in terms of dissolved metal.
- T The organoleptic effect criterion is more stringent than the value for priority toxic pollutants.
- U This value was derived from data for heptachlor and the criteria document provides insufficient data to estimate the relative toxicities of heptachlor and heptachlor epoxide.
- V There is a full set of aquatic life toxicity data that show that DEHP is not toxic to aquatic organisms at or below its solubility limit.
- W This value was derived from data for endosulfan and is most appropriately applied to the sum of alpha-endosulfan and beta-endosulfan.
- X This criterion is based on a 304(a) aquatic life criterion issued in 1980 or 1986, and was issued in one of the following documents: Aldrin/Dieldrin (EPA 440/5-80-019), Chlordane (EPA 440/5-80-027), DDT (EPA 440/5-80-038), Endrin (EPA 440/5-80-047), Heptachlor (EPA 440/5-80-052), Polychlorinated Biphenyls (EPA 440/5-80-068), Toxaphene (EPA 440/5-86-006). This CCC is based on the Final Residue value procedure in the 1985 Guidelines. Since the publication of the Great Lakes Aquatic Life Criteria Guidelines in 1995 (60FR15393-15399, March 23, 1995), the EPA no longer uses the Final Residue value procedure for deriving CCCs for new or revised 304(a) aquatic life criteria.
- Y This water quality criterion is based on a 304(a) aquatic life criterion that was derived using the 1985 Guidelines (*Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses*, PB85-227049, January 1985) and was issued in one of the following criteria documents: Arsenic (EPA 440/5-84-032), Cadmium (EPA 440/5-84-029), Copper (EPA 440/5-84-031), Cyanide (EPA 440/5-84-028), Lead (EPA 440/5-84-027), Nickel (EPA 440/5-86-004), Pentachlorophenol (EPA 440/5-86-009), Toxaphene, (EPA 440/5-86-006), Zinc (EPA 440/5-87-003).
- Z When the concentration of dissolved organic carbon is elevated, copper is substantially less toxic and use of Water-Effect Ratios might be appropriate.
- aa The selenium criteria document (EPA 440/5-87-006, September 1987) provides that if selenium is as toxic to saltwater fishes in the field as it is to freshwater fishes in the field, the status of the fish community should be monitored whenever the concentration of selenium exceeds 5.0 $\mu\text{g/L}$ in salt water because the saltwater CCC does not take into account uptake via the food chain.
- bb This water quality criterion was derived on page 43 of the mercury criteria document (EPA 440/5-84-026, January 1985). The saltwater CCC of 0.025 $\mu\text{g/L}$ given on page 23 of the criteria document is based on the Final Residue value procedure in the 1985 Guidelines. Since the publication of the Great Lakes Aquatic Life criteria Guidelines in 1995 (60FR15393-15399, March 23, 1995), the EPA no longer uses the Final Residue value procedure for deriving CCCs for new or revised 304(a) aquatic life criteria.
- cc This water quality criterion was derived in *Ambient Water Quality Criteria Saline Water Copper Addendum* (Draft, April 14, 1995) and was promulgated in the Interim Final National Toxics Rule (60FR22228-22237, May 4, 1995).
- dd This water quality criterion was derived from data for inorganic mercury (II), but is applied here to total mercury. If a substantial portion of the mercury in the water column is methylmercury, this criterion will probably be under protective. In addition, even though inorganic mercury is converted to methylmercury and methylmercury bioaccumulates to a great extent, this criterion does not account for uptake via the food chain because sufficient data were not available when the criterion was derived.
- ee This criterion is a noncarcinogen. As prescribed in Section E of this regulation, application of this criterion for determining permit effluent limitations requires the use of 7Q10 or comparable tidal condition as determined by the Department.
- ff EPA is currently reassessing the criteria for arsenic.
- gg This criterion applies to DDT and its metabolites (i.e., the total concentration of DDT and its metabolites should not exceed this value).
- hh Although a new RfD is available in IRIS, the surface water criteria will not be revised until the National Primary Drinking Water Regulations: Stage 2 Disinfectants and Disinfection Byproducts Rule (Stage 2 DBPR) is completed, since public comment on the relative source contribution (RSC) for chloroform is anticipated.
- ii Although EPA has not published a completed criteria document for phthalate, it is EPA's understanding that sufficient data exist to allow calculation of aquatic life criteria.

Attachment 2 - Parameters for Calculating Freshwater Dissolved Metals Criteria That Are Hardness-Dependent

Chemical	m_A	b_A	m_C	b_C	Freshwater Conversion Factors (CF)	
					Acute	Chronic
Cadmium	1.0166	-3.924	0.7409	-4.719	$1.136672 - [\ln(\text{hardness})(0.041838)]$	$1.101672 - [\ln(\text{hardness})(0.041838)]$
Chromium III	0.8190	3.7256	0.8190	0.6848	0.316	0.860
Copper	0.9422	-1.700	0.8545	-1.702	0.960	0.960
Lead	1.273	-1.460	1.273	-4.705	$1.46203 - [\ln(\text{hardness})(0.145712)]$	$1.46203 - [\ln(\text{hardness})(0.145712)]$
Nickel	0.8460	2.255	0.8460	0.0584	0.998	0.997
Silver	1.72	-6.52	--	--	0.85	--
Zinc	0.8473	0.884	0.8473	0.884	0.978	0.986

Hardness-dependent metals criteria may be calculated from the following:

$CMC_{(total)} = \exp\{m_A [\ln(\text{hardness})] + b_A\}$, or $CCC_{(total)} = \exp\{m_C [\ln(\text{hardness})] + b_C\}$

$CMC_{(dissolved)} = \exp\{m_A [\ln(\text{hardness})] + b_A\}$ (CF), or $CCC_{(dissolved)} = \exp\{m_C [\ln(\text{hardness})] + b_C\}$ (CF).